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APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO	CONFIRMATION NO
09/974,922	10/09/2001	Michael N. Grimbergen	5762	1090

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[REDACTED] EXAMINER

MEYER, DAVID C

ART UNIT	PAPER NUMBER
	2878

DATE MAILED: 05/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/974,922

Applicant(s)

GRIMBERGEN, MICHAEL N

Examiner

David C. Meyer

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

1)  Responsive to communication(s) filed on 04 March 2003.  
2a)  This action is **FINAL**.      2b)  This action is non-final.  
3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

4)  Claim(s) 1-35 is/are pending in the application  
4a) Of the above claim(s)       is/are withdrawn from consideration.  
5)  Claim(s)       is/are allowed.  
6)  Claim(s) 1-35 is/are rejected.  
7)  Claim(s)       is/are objected to.  
8)  Claim(s)       are subject to restriction and/or election requirement.

### Application Papers

9)  The specification is objected to by the Examiner.  
10)  The drawing(s) filed on       is/are: a)  accepted or b)  objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
11)  The proposed drawing correction filed on       is: a)  approved b)  disapproved by the Examiner.  
    If approved, corrected drawings are required in reply to this Office action.  
12)  The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

13)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f)  
a)  All b)  Some \* c)  None of:  
    1.  Certified copies of the priority documents have been received.  
    2  Certified copies of the priority documents have been received in Application No.      .  
    3  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a))  
\* See the attached detailed Office action for a list of the certified copies not received.  
14)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)  
a)  The translation of the foreign language provisional application has been received.  
15)  Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

1:  Notice of References Cited (PTO-892)  
2:  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3:  Information Disclosure Statement(s) (PTO-1449) Paper No(s)      

4:  Interview Summary (PTO-413) Paper No(s)        
5:  Notice of Informal Patent Application (PTO-152)  
6:  Other

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments, see pages 13-14 of Amendment A, filed March 4, 2003, with respect to the rejection(s) of claim(s) 1, 12, 23, and 31 under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Suzuki (US 4,970,546).

### *Claim Rejections - 35 USC § 102*

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 12, 23, and 26-35 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki (US 4,970,546).

Regarding claims 1 and 12, Suzuki discloses an exposure control device used in a semiconductor manufacturing process. The device comprises a pulse light source 10 connected to an energy source (not shown, but inherent). A light detector 24 is positioned to receive light pulses from light source 10. A monitor circuit 26 connected to light detector 24 integrates the intensity of the light pulses and supplies the integrated value to a main control system 8 for signal processing. Main control system 8 sends start and stop signals to a trigger circuit 9 for cutting off the pulse light source in response to the integrated intensity signals. (See Fig. 1; column 4, lines 10-23; and column 6, lines 35-63.)

An additional photosensor (not shown) for obtaining an integrated intensity value may be placed at a support stage for supporting a semiconductor wafer W

undergoing a photolithographic process (column 12, lines 33-43). The photolithographic process would necessarily take place inside a reactor chamber of a semiconductor manufacturing system. Hence, the additional photodetector receives light pulses inside a reactor chamber of a semiconductor manufacturing system.

Regarding claims 23 and 31, the device of Suzuki performs the steps of generating light pulses from a light source 10 into the process reactor (not shown, but inherent) of a semiconductor wafer processing system; detecting the light pulses in the process reactor with an illumination sensor located on a support stage of the process reactor; integrating the light intensity of the pulses; and cutting off the pulse light source in response to the integrated intensity signals. The comparison to a predetermined intensity value is inherent. Such a predetermined intensity value would be stored in memory 6, which main control system 8 accesses to control a trigger circuit 9 for cutting off the pulse light source.

Regarding claims 26-29, monitor circuit 26 integrates light intensity signals corresponding to light pulses detected by light detector 24.

In response to the integrated light intensity signal obtained by monitor circuit 26, main control system 8 sends oscillation start and end signals to trigger circuit 9, which in turn triggers the starting and stopping (cutting off) of pulse light source 11. Oscillation signals have a predetermined duration. Hence, the light pulses would have a predetermined duration.

Regarding claim 30, trigger circuit 9 cuts off pulse light source 11 when main control circuit 8 determines the integrated light intensity signal has reached a predetermined level.

Regarding claim 32, the light pulses emitted by light source 11 can be viewed as a series of consecutive single light pulses having a predetermined duration.

Regarding claims 33-35, the device of Suzuki performs the functions of emitting a plurality of light pulses, which are detected as light intensity values and integrated into an integrated light intensity signal.

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 2, 5-11, 13, 16-22, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki.

Regarding claims 2, 5, 13, and 16, an integrator is an inherent part of the monitor circuit 26, which performs integration of light pulses detected by detector 24. A threshold comparator would be inherent to the main control system 8, which controls light source cutoff according to the integrated light intensity.

Suzuki does not disclose a capacitor energy source for pulsing light source 11. It is well known to use a capacitor as an energy source in pulse light applications because pulses of desired intensity can be achieved simply by varying the charge on the capacitor. It would have been obvious to one of ordinary skill in the

art at the time of invention to use a capacitor in the pulsing of light source 11 of Suzuki because it is a simple and versatile means of driving a pulse light.

Regarding claims 6-9 and 17-20, the examiner has argued that it would have been obvious to use a capacitor in the pulsing of light source 11. Suzuki discloses a trigger circuit 9 that is positioned between the pulse light source 11 and main control system 8, to which a threshold comparator would be inherent. The trigger circuit starts and stops light pulses based on oscillation signals from main control system 8. This constitutes a repeated turning on and off. An oscillation signal has a predetermined frequency. Hence, the light pulses would have a predetermined duration.

Regarding claims 10-11 and 21-22, light detector 24 produces electrical light intensity signals in response to light pulses. Monitor circuit 26 integrates these light intensity signals into an integrated light intensity signal. Trigger circuit 9 cuts off pulse light source 11 when main control circuit 8 determines the integrated light intensity signal has reached a predetermined level.

Claims 3-4, 14-15, and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Johnson (US 5,969,805). Suzuki does not disclose a wavelength selective filter element associated with detector 24. It is well known to use a wavelength selective filter element in order to detect light that is free from undesired wavelengths, as taught by Johnson. Johnson discloses an apparatus for detecting the endpoint of a semiconductor manufacturing process. The apparatus comprises a photomultiplier light detector 142 having a filter element 140. It would have been obvious to one of ordinary

skill in the art at the time of invention to modify Suzuki by incorporating a wavelength selective filter element in order to detect a beam free from undesired wavelengths.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Wani (US 5,134,273) discloses a pulse light drive circuit. Uesugi (US 5,870,789) discloses a monitoring system used in a semiconductor manufacturing process. Suzuki (US 5,627,627) and Nakamura (US 6,252,650) disclose exposure control apparatuses used in a semiconductor manufacturing process.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David C. Meyer whose telephone number is 703-305-7955. The examiner can normally be reached on M-F 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on 703-308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0935.

DCM  
May 23, 2003

*DCM*  
**DAVID PORTA**  
**SUPERVISORY PATENT EXAMINER**  
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